

Mean areas and heliographic latitudes of Sun-spots in the year 1895, deduced from photographs taken at the Royal Observatory, Greenwich, at Dehra Dûn (India), and in Mauritius.

(Communicated by the Astronomer Royal.)

The results here given are in continuation of those printed in the *Monthly Notices*, vol. lvii. p. 2, and are deduced from the measurements of solar photographs taken at the Royal Observatory, Greenwich, at Dehra Dûn, India, and at the Royal Alfred Observatory, Mauritius.

Table I. gives the mean daily areas of umbræ, whole spots, and faculæ for each synodic rotation of the Sun in 1895, and Table II. gives the same particulars for the entire year 1895 and the six preceding years for the sake of comparison. The areas are given in two forms. First, projected areas—that is to say, as seen and measured on the photographs—these being expressed in millionths of the Sun's apparent disc; and next, areas as corrected for fore-shortening, the areas in this case being expressed in millionths of the Sun's visible hemisphere.

Table III. exhibits for each rotation in 1895 the mean daily area of whole spots, and the mean heliographic latitude of the spotted area for spots north and for spots south of the equator, together with the mean heliographic latitude of the entire spotted area, and the mean distance from the equator of all spots; and Table IV. gives the same information for the year as a whole, similar results from 1889 to 1894 being added, as in the case of Table II. Tables II. and IV. are thus in continuation of the similar tables for the years 1874 to 1888, on pp. 381 and 382 of vol. xlix. of the *Monthly Notices*.

TABLE I.

No. of Rotation.	Date of Commencement of each Rotation.	No. of Days on which Photographs were taken.	Mean of Daily Areas.		Projected Whole Spots.	Corrected for Foreshortening.	
			Umbrae.	Faculae.		Umbrae.	Faculae.
552	1895 Jan. 2 ⁶⁴	26	214	1931	1208	149	2137
553	Jan. 29 ⁹⁷	28	240	1936	1296	175	2136
554	Feb. 26 ³²	27	257	1858	1552	179	2104
555	Mar. 25 ⁶³	27	183	2085	1029	138	2460
556	Apr. 21 ⁹¹	27	211	2224	1133	158	2493
557	May 19 ¹⁴	27	306	2472	1764	217	2690
558	June 15 ³⁴	28	222	2145	1294	158	2380
559	July 12 ⁵⁴	27	217	2010	1228	143	2292
560	Aug. 8 ⁷⁶	27	267	2177	1508	195	2420
561	Sept. 5 ⁰⁰	27	210	2177	1206	149	2399
562	Oct. 2 ²⁷	28	290	2071	1641	200	2230
563	Oct. 29 ⁵⁶	27	231	1793	1178	163	1902
564	Nov. 25 ⁸⁶	27	194	1847	1026	142	1948

TABLE II.

Year.	No. of Days on which Photographs were taken.	Umbrae.	Mean of Daily Areas.		Projected Whole Spots.	Corrected for Foreshortening.	
			Faculae.	Umbrae.		Whole Spots.	Faculae.
1889	360	179	107	131	103	780	131
1890	361	213	273	155	133	994	304
1891	363	120	1322	862	745	569	1412
1892	362	255	3230	186	1596	1214	3270
1893	362	327	2287	234	1983	1464	2404
1894	364	317	1666	231	1728	1282	1877
1895	364	237	2059	169	1330	974	2278

TABLE III.

No. of Rotation.	Date of Commence- ment of each Rotation. d.	No. of Days on which Photographs were taken.	Spots North of the Equator. Mean of Daily Areas.	Mean Heli- graphic Latitude.	Spots South of the Equator. Mean of Daily Areas.	Mean Heli- graphic Latitude.	Mean Heliographic Latitude of Entire Spotted Area.	Mean Distance from Equator of all Spots.
552	1895 Jan. 2.64	26	392	12.51	461	14.19	- 1.91	13.42
553	Jan. 29.97	28	506	13.69	485	11.62	+ 1.30	12.68
554	Feb. 26.32	27	605	13.07	509	9.02	+ 2.97	11.22
555	Mar. 25.63	27	551	13.66	261	11.77	+ 5.48	13.05
556	Apr. 21.91	27	604	19.13	249	15.42	+ 9.05	18.05
557	May 19.14	27	686	16.41	594	16.68	+ 1.06	16.53
558	June 15.34	28	615	15.25	348	12.11	+ 5.37	14.12
559	July 12.54	27	302	12.80	531	9.00	- 1.11	10.38
560	Aug. 8.76	27	976	13.87	159	10.43	+ 10.46	13.38
561	Sept. 5.00	27	521	13.73	347	14.63	+ 2.39	14.09
562	Oct. 2.27	28	782	14.38	392	15.07	+ 4.54	14.61
563	Oct. 29.56	27	561	11.56	290	8.04	+ 4.88	10.36
564	Nov. 25.86	27	340	13.05	447	13.22	- 1.86	13.15

TABLE IV.

Year.	No. of Days on which Photographs were taken.	Spots North of the Equator. Mean of Daily Areas.	Mean Heli- graphic Latitude.	Spots South of the Equator. Mean of Daily Areas.	Mean Heli- graphic Latitude.	Mean Heliographic Latitude of Entire Spotted Area.	Mean Distance from Equator of all Spots.
1889	360	5.0	+ 7.26	73.0	- 11.90	- 10.68	11.61
1890	361	53.1	+ 22.20	46.3	- 21.75	+ 1.73	21.99
1891	363	401	+ 20.49	169	- 19.91	+ 8.52	20.31
1892	362	607	+ 15.09	607	- 21.69	- 3.29	18.39
1893	360	517	+ 14.91	941	- 14.26	- 3.93	14.49
1894	364	543	+ 12.31	739	- 15.56	- 3.75	14.18
1895	364	565	+ 14.26	409	- 12.54	+ 3.01	13.54

The rotations in Table I. and Table III. are numbered in continuation of Carrington's series (*Observations of Solar Spots made at Redhill*, by R. C. Carrington, F.R.S.), No. 1 being the rotation commencing 1853 November 9. The assumed prime meridian is that which passed through the ascending node at mean noon on 1854 January 1, and the assumed period of the Sun's sidereal rotation is 25.38 days. The dates of the commencement of the rotations are given in Greenwich civil time, reckoning from mean midnight.

The Sun-spot record for 1895, as brought out by the above tables, shows some interesting points of comparison with the record for 1894.

(1) The decrease in the mean daily area of whole spots commenced in 1894 has been very distinctly continued in 1895; and this area has now fallen below those of 1882, 1883 or 1884, the years of maximum of the preceding cycle.

(2) The umbræ, which gave practically the same area for 1894 as for 1893, show for 1895 a diminution of 27 per cent.

(3) But the faculæ, which had declined very rapidly from their maximum in 1892, a year earlier than that of the spots, showed a distinct revival in 1895, their mean daily area for that year nearly rising to the same numbers as for 1893.

(4) Taking the two hemispheres separately, the decrease in the area of whole spots has been limited, as in 1894, to the southern hemisphere; the slight recovery of the northern having been further continued.

(5) In consequence of this decline of the southern hemisphere, the predominance has passed over to the northern.

(6) Little change has taken place in the mean distribution of all spots in heliographic latitude, but the general trend of movement is still towards the equator. But the mean distance from the equator is still greater than in 1883, the year of maximum of the preceding cycle.

(7) When the two hemispheres are considered separately, it is seen that this equatorial movement is wholly confined to the southern hemisphere; in the northern there has been a distinct increase in the mean latitude of the spotted area. Precisely the reverse conditions prevailed in 1894.

(8) No day in 1895 was entirely free from spots, although on November 10 but a single very small spot was seen.